

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Victor V. Kulish
Serial No. : 10/022,288
Filed: : December 20, 2001
For: : Electronic Sterilizer
TC/AU : 1744
Examiner : Monzer R. Chorba
Attorney Docket No. : VVK 2-001

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DECLARATION UNDER 37 C.F.R. 1.132

Victor V. Kulish declares as follows:

- 1) That he is a citizen of the Ukraine and resides at 55 Kosmonaviv Prospect, Apartment 13, Sumy, Ukraine;
- 2) That he holds bachelor and master of science degrees in Radio-engineering from the Special Faculty of Moscow Energetical Institute, a doctoral degree in Theoretical and Mathematical Physics from the Kiev State University and a doctor of science degree in Physical Electronics from the Institute of Physics of Ukrainian Academy of Sciences, all in Kiev, Ukraine;
- 3) That his curriculum vitae is annexed hereto as Exhibit A;
- 4) That he currently holds the position of Director of the Institute of Advanced Technologies and the Head of the Department of Physics I at the National Aviation University in Kyiv, Ukraine;
- 5) That he is an inventor named in the above-identified application for United States patent;
- 6) That he has been advised that claims 1-5 have been rejected under 35 U.S.C. §103 as being unpatentable over the admitted state of the prior art in view of U.S. Patent No. 6,626,750 issued to Sergey Alexandrovich Korenev (Korenev);
- 7) That the present application's specification discloses that certain electronic sterilizers in the prior art use an linear induction accelerator (LIA) to provide an electron beam source. An LIA achieves acceleration of electrons by the action of a longitudinal vortex


electron field having relatively low frequency, the field being generated by special inductors in the working acceleration channel;

- 8) That a particular disadvantage of an LIA is the generation of a significantly strong vortex external field generated in the space surrounding the LIA. Such a strong external electric field has a negative impact on both the personnel working in the vicinity of the LIA and the object to be irradiated, resulting in a "dead zone" around the device. Additionally, the LIA and certain objects to be treated must be spaced apart a distance at which the intensity of the external electric field decreases to acceptable values. This distance is necessary because exposure to a strong electric field is forbidden for certain objects. For example, for an LIA producing an electron beam of 18 MeV the separation distance is approximately 20 meters. As a consequence of these electromagnetic compatibility issues, LIAs are excessively large and may not be acceptable for irradiation of certain objects;
- 9) That an LIA-based electron sterilizer has only one limited width and limited current strength electron beam. Using a single beam of limited width and strength means a greater time is required to fully irradiate the entire surface area of an object resulting in lower productivity;
- 10) That Korenev discloses an RF-type rotary accelerator. Such a device utilizes microwave generators to accelerate the electrons. Such generators are relatively expensive to produce and operate. Additionally, as with LIAs as described above, microwave generators have a negative impact on the work environment and certain food and pharmaceutical products;
- 11) That the present application discloses and claims a multi-channel linear induction acceleration system (MLIA), which provides several advantages over LIA and RF-type accelerators;
- 12) That in an MLIA the acceleration channels of any two neighboring linear acceleration blocks are directed reciprocally opposite to one another. Owing to this, the external electric fields generated by each acceleration block effectively cancel each other out and, thus, produce a much smaller external electric field, which is safer for workers, eliminates the "dead zone" associated with LIAs, and allows the MLIA to be used in a broader range of applications.
- 13) That an MLIA provides increased acceleration rates of the separate linear accelerators;
- 14) That an MLIA may operate in a trigger mode wherein one part of the acceleration block accelerates the beams, while the other part "rests." This enables the magnetic cores therein to remagnetize;

- 15) That there is no teaching or suggestion in any of the cited references to combine an linear induction accelerator with an RF-type accelerator;
- 16) That there is no teaching or suggestion in any of the cited references how an LIA could be modified to provide more than one output, as with a rotary accelerator such as that disclosed in Korenev;
- 17) That, in fact, Korenev discloses that linear accelerators may be used instead of a single rotary accelerator but that there would have to be as many accelerators as there are desired outputs;
- 18) That even if an LIA could be modified to provide more than one output it still would not provide the above-cited benefits achieved with an MLIA and would still experience all of the drawbacks of an LIA;
- 19) That he has been advised that claims 6-7, 10-12, and 15-17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the admitted state of the prior art in view of Korenev and in further view of U.S. Patent No. 5,357,291 issued to Peter R. Schonberg, et al. (Schonberg);
- 20) That Korenev discloses a device including a rotary accelerator capable of producing an electron beam at a plurality of output ports. Each output is directed to a designated conveyor carrying a particular product to be irradiated. In use, the radiation type for each output port is determined (e.g., x-ray or electron beam), then the electron energy for that output is chosen, as is the speed for the conveyor associated with that output port. If additional radiation is needed for a given product, the product can make a second pass on the same conveyor or may be moved to a different conveyor for irradiation with a different intensity of radiation;
- 21) That Korenev does not teach or disclose using multiple electron beams which are defocused in such a manner wherein the channel outputs of adjacent channels overlap and mutually extend over the treatment region, thus, simultaneously treating a product with multiple beams of radiation;
- 22) That with this simultaneous use of multiple beams, the power of any single output of the MLIA may be less than that which would be required if a single output beam were used to irradiate a given product as in Korenev;
- 23) That Schonberg describes a transportable electron beam system utilizing a pulsed linear electron accelerator, the electrons being accelerated by energy generated by a microwave source such as a magnetron. The output of the accelerator is a single electron beam as shown in Figs. 3 and 4, which may be defocused onto a window which separates the accelerator from a reaction chamber.

- 24) That Schonberg does not disclose an MLA or the defocusing multiple channel outputs of adjacent channels in order to overlap and mutually extend over a treatment region;
- 25) That he has been advised that claims 8-9, 13-14 and 18-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the admitted state of the prior art in view of Korenev and Schonberg and in further view of U.S. Patent No. 4,704,565 issued to Allen P. Blacker, Jr., et al. (Blacker);
- 26) That Blacker discloses an electron gun for television receiver cathode ray tubes, wherein three outputs are converged to a single spot on a target surface, such as a television screen. Resolution of the television is determined by the size and symmetry of the converged beam spots.
- 27) That Blacker is not analogous art and, if analogous art, fails to suggest the problem posed and solved by the present invention;
- 28) That he, as a person skilled in the art at hand would not look to Blacker, a document describing an electron gun for television receiver cathode ray tubes to address a sterilization related problem;
- 29) That it is his considered opinion that the combination of the admitted prior art, Korenev, Schonberg, and Blacker do not suggest or render obvious the method described and claimed in the above-identified application for United States patent; and
- 30) That all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like, so made, are punishable by fine, or imprisonment, or both, under § 1001 of Title 18, and that such willful false statements may jeopardize the validity of the application or any document resulting therefrom.
- Further Declarant sayeth naught.

Date November 21, 2005


Victor V. Kulish